

REMARKS

Claims 1-20 were pending in this application as of the August 25, 2004 mailing date of the current office action, in which these claims were non-finally rejected pursuant to 35 U.S.C. §103. The current office action also includes an objection to certain figures as not being properly designated by a "prior art" legend. Applicant submits that these rejections and objections are either overcome or demonstrated to be inappropriate in view of at least the amendments set forth above and/or the remarks that follow.

Objections to the Drawings

The Examiner objects to Figures 4, 5, 6a-6h, 7a-7c and 8a-8f because the figures do not include a "prior art" legend despite illustrating "only that which is old." Applicant has amended these figures to include a prior art legend, as denoted on the enclosed REPLACEMENT SHEETS. Applicant also has amended Figure 3 to include a "prior art" legend because it depicts a conventional apparatus. A REPLACEMENT SHEET reflecting the amendment to Figure 3 is enclosed herein as well.

Applicant submits that the amended figures enclosed herein are effective to overcome the objections to the drawings, and, therefore, such objections must be withdrawn.

Claim Rejections - 35 U.S.C. §103

Claims 1-15 are rejected pursuant to 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Application Publication No. US 2002/0126390 A1 to Matsushita et al. ("the Matsushita publication"), and claims 16-20 are rejected pursuant to the same statutory provision over the combination the Matsushita publication and U.S. Patent Application Publication No. US 2003/0091781 A1 to Arakawa et al. ("the Arakawa Publication"). Applicant respectfully traverses these rejections, which Applicant submits are improper in view of the patentable differences between claims 1-20 and what is disclosed in and/or suggested by the cited references.

The method of claim 1-15 and the apparatus of claims 16-20 include features that are neither disclosed in nor suggested by the cited references and that beneficially enable mass production manufacturing of a micro-lens array substrate with greater ease, and in fewer steps as compared to known techniques.

In accordance with both the method of claim 1 and the method of claim 9, a micro-lens array substrate is manufactured using a stamper having micro-lens array patterns on both surfaces of the stamper, such that a micro-lens made of a third light transmitting resin is formed between the first micro-lens array and the second micro-lens array. At this step in the methods, the stamper has micro-lens array patterns on both of its surfaces, thus beneficially eliminating the need for positioning the respective lens array patterns.

The methods of claims 1 and 9 differ from conventional manufacturing techniques in which a micro-lens array substrate is manufactured utilizing different stampers. Such conventional techniques require alignment (i.e., positioning) of the stampers when the stamper is attached to the die sets. And because the methods of claims 1 and 9 eliminate the need to align (i.e., position) the stampers when the stamper is attached to the die sets, such claimed methods thus enable mass production manufacturing of a micro-lens array substrate with greater ease, and in fewer steps as compared to conventional techniques.

Similarly, in accordance with the apparatus of claim 16, different micro-lens array patterns are formed on both surfaces of the stamper; consequently, it is not necessary to align (i.e., position) the micro-lens array patterns. Therefore, usage or implementation of the apparatus of claim 16 would likewise enable manufacturing of a micro-lens array substrate with vastly improved ease as compared to a conventional manufacturing apparatus.

Regarding the Matsushita publication, it discloses a lens array substrate, which is made up of "transparent three lens resin layers 18, 17, 16 having different refractive indices between base glasses 19 and 15." See numbered paragraph 0060. A stated object of the invention described in the Matsushita publication is "to provide a compact lens array substrate with high optical efficiency . . . capable of focusing and reflecting an incident beam from an optical source without loss." See numbered paragraph 0012.

The Matsushita publication does not describe actual steps for manufacturing a lens array substrate, let alone the steps recited in claims 1 and 9 of the present application. Instead, numbered paragraphs 0034 and 0035 of the Matsushita publication merely describe that a multi-layered lens array substrate can be manufactured in such a manner that after a pair of lens array substrates are constructed, the lens array substrates are attached to each other on their surfaces (i.e., on their surfaces having no lens arrays) using a transparent resin adhesive. And as can be seen by reference to Figures 5(b) and 5(c) of the Matsushita publication, an as-manufactured multi-layered lens array substrate arrangement according to the Matsushita publication is totally different from the arrangement of the micro-lens array substrate obtained by the manufacturing method of claims 1 and 9 and the apparatus of claim 16.

Moreover, the Matsushita publication calls for manufacturing a lens array substrate in such a manner that a lens resin layer 44 is sealed by a sealing resin 43. See numbered paragraph 0053. In other words, the Matsushita publication requires that the sealing resin 43 be formed after formation of the lens resin layer 44. This too is in contrast to claims 1 and 9 of the present invention, which recite that after the first and second (i.e., both) micro-lens arrays are formed, a micro-lens is formed between the first and second micro-lens arrays. In short, the Matsushita publication discloses that lens resin layer 44 is *formed first*, whereas the claimed invention recites that the micro lens is *formed after formation of the micro-lens arrays* (i.e., the micro-lens is formed utilizing the micro-lens arrays as "patterns").

Additionally, the Matsushita publication teaches that alignment (i.e., positioning) of lens array substrates is carried out only after a pair of lens array substrates are constructed. However, in accordance with the claimed invention, alignment between the first transparent substrate, the second transparent substrate, and the stamper has already occurred prior to formation of the first micro-lens array and the second micro-lens array. This further underscores that the invention recited in claims 1, 9 and 16 is quite different from what is described in the Matsushita publication.

In sum, the Matsushita publication contains scant disclosure regarding the manufacturing of its multi-layered microlens array, and the few details that are provided are either explicitly different from, or are not suggestive of the features recited in the method of claims 1-15 and the apparatus of claims 16-20 of this application. Moreover, the differences between the claimed invention and that which is described in the Matsushita publication also contribute to the ability of the present invention to enable mass production manufacturing of a micro-lens array substrate with greater ease, and in fewer steps as compared to known techniques such as those disclosed in the Matsushita publication. For at least these reasons, claims 1, 9 and 16 are patentable over the Matsushita publication.

The Arakawa publication does not remedy the deficiencies of the Matsushita publication - that is, the Examiner's combination of the Matsushita publication and the Arakawa publication does not suggest the claimed invention.

The Arakawa publication discloses a production apparatus of an information recording medium (compression molding apparatus) that includes an upper mold 103, a first center mold 106, a first stamper 109, a second stamper 110, a second center mold 111, a lower mold 114, etc. See, e.g., numbered paragraph 166. The production apparatus produces an information recording medium wherein a resin sheet or a disk substrate 120 is clamped by the two stampers 109 and 110 and then pressed and heated to thereby transfer the relief shapes of the stampers 109 and 110 to the resin sheet or the disk substrate 120. See numbered paragraphs 0165-0169 and Figure 20.

Thus, the Arakawa publication teaches a production apparatus for use in a compression and molding process using molds (i.e., so-called pressure molding). Given the disclosure and technical field of the Arakawa publication, there would be no motivation - absent impermissible hindsight - for one of ordinary skill in the art to combine the teachings of the Arakawa publication and the Matsushita publication in order to produce the claimed invention.

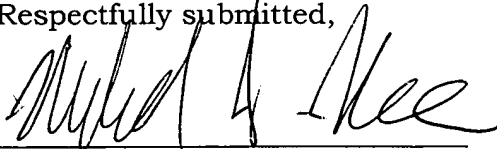
Moreover, even assuming, *arguendo*, that such a combination was properly motivated (which it is not), Applicant nevertheless submits that the resulting combination does not disclose the claimed apparatus and method for manufacturing a micro-lens array substrate in view of the shortcomings of the Matsushita publication and the fact that such shortcomings are not remedied by the Arakawa publication. In particular, a combination of these references does not disclose the novel and non-obvious number and arrangement of the stampers as recited in claim 16 or the novel and non-obvious method of using the stamper as recited in claims 1 and 9.

Still further, the features of claims 1, 9 and 16 that are neither disclosed in nor suggested by the cited references are among the features that contribute to the beneficial aspects of the claimed invention, namely that the claimed invention enables mass production manufacturing of a micro-lens array substrate with greater ease, and in fewer steps as compared to known techniques.

For at least the foregoing reasons, claims 1, 9 and 16 are believed to be patentable over the cited references. And wherein the remaining pending claims depend (either directly or ultimately) from one of claims 1, 9 and 16, these dependent claims are believed to be patentable over the cited references as well for at least the same reasons. Thus, claims 1-20 are believed to be in condition for allowance, and reconsideration and allowance thereof are respectfully requested.

If the undersigned can be of any assistance in advancing the prosecution of this case, the Examiner is invited to contact him via the information provided below.

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Respectfully submitted,

By: Richard J. Roos (Reg. No. 45,053)
EDWARDS & ANGELL, LLP
P.O. Box 55874
Boston, MA 02205
Telephone: (617) 439-4444
Facsimile: (617) 439-4170
Email: rroos@edwardsangell.com

Noboru FUJITA.
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In the Drawings

Please amend FIGS. 3, 4, 5, 6a-6h, 7a-7c and 8a-8f as shown on the enclosed
REPLACEMENT SHEETS.